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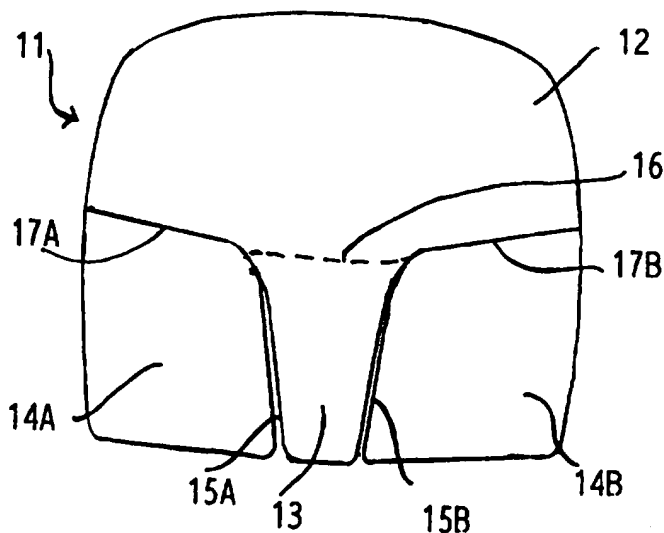
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(57) Abstract

A chair seat (11) being divided into several parts (12, 13, 14A-B). It comprises a part (13) being fixed and a pivoting part (14A-B), where the pivoting part may pivot down from a starting position around a crossing axis (17A, 17B) against an elastic counter force, enabling a change of the sitting position by having the user change the angle of the hips.



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Chair Seat

The invention describes a chair seat similar to the one described in the introduction of patent claim 1 and a chair made with this chair seat.

5 Background

Even if chairs can be used differently depending on the work and the purpose, there is no chair offering the possibility of constantly adjusting the chair seat and the back depending on different positions and use.

It is known that different elements and seat positions of office and working chairs can be
10 adjustable. In this way the seat height, the seat angle, the back angle, the back position and the back cushioning can be adjusted. Such adjustment is satisfactory in adjusting a chair if different users accept one particular position, or users only seldom require an adjustment of the chair. Users wanting or needing to change the position of sitting more often do not find the known chairs to be satisfactory.

15 Known chairs are not satisfactory when it comes to adjusting the shape of the seat to a great degree from the usual way of sitting. Chairs are known where the seat is divided in a rear part and a front part flexibly connected. The user is therefore able to regulate the angle of the front part by moving the body weight forwards or backwards, with respect to the connecting line. These chairs offer some adjustment possibilities, but not more than to meet
20 the needs of a meeting chair.

Chairs for the disabled are known with seats divided into several parts, where one or more part can be adjusted to suit a particular position of the legs.

German Patent No. 800.488 describes a chair for the disabled where the seat is extended in a forward direction with two parallel, mutually independent adjustable supporting wings.
25 These supporting wings can also be adjusted in order to meet different needs and positions of use, but the adjustment must take place in advance and is fairly bothersome to carry out. The mechanism of adjustment presented by this chair is not suited for chairs where the seat is to adjusted automatically due to different situations of use.

From the German Publication No. 29 06 602 describes a chair for the disabled where the
30 seat is divided into one fixed part shaped like a saddle, being raiseable, extending over the central part or the total rear side of the seat, and a front part pivoting downwards and forming the rest of the seat. The object is be able to lift the patient up to a standing position where the patient is supported by the seat of the chair, that is the saddle shaped part of the

seat. This construction is not suitable for an ordinary office chair, where an easy adjustment is wanted due to the different positions of work and use.

Norwegian Patent No. 157.003 describes chair particularly for persons with a stiff hip and/or legs, where a part of the seat can pivot downwards according to the position of the
5 legs and be locked in a position adjusted for individual use. It is not possible to make this seat shape flexibly adjustable so that the user can reach different positions of the moveable parts of the seat without adjustment.

Chairs having knee supports known in addition to the saddle shaped seat are, enabling the user to change between a traditional sitting position and a half upright position wherein the
10 body is supported by both the seat and the knee supports. Even if this chair offers the possibility of choosing the position of sitting, the chair is not satisfactory to users wanting great flexibility in the position of use and in the seat form.

Object

15 The main object of this invention is to create a chair seat and a chair allowing the user to vary the positions of sitting, and at the same time having support when seated with the lower part of the body in different positions. The chair must be adjusted to serve as a working chair, e.g. office chairs, but also as ordinary chairs, e.g. chairs to be used in conference and meeting rooms as well as in canteens.

20 It is a special object to create a chair that has a simple design, with as few parts as possible being adjustable and/or movable, but allowing individual adjustment of the sitting position without adjustment.

It is also an object to create a chair seat, and thus a chair, in which the user can sit in positions very different from usual sitting positions, e.g. if the legs do have different position
25 in relation to the seat and therefore must be supported differently, as is the case with chairs for the disabled, but where there is a need to return back to a normal position of sitting without special re-adjustment of the chair.

It is also an important object to have a chair produced from a low consumption of materials, that can be purchased in cases where there are no possibilities of purchasing
30 technically complicated and expensive chairs.

The invention

The invention is described in the characterizing part of patent claim 1.

The main point of this invention is linked to a particular structure of the seat with parts being mutually flexible, and to a connection offering the possibility of resetting the flexible parts into a neutral position.

This concept offers the possibility of creating a chair that is adjustable for a large range of
5 different usage, and with the possibility of being made flexible all according to use and the position of sitting. In the most simple form the chair may be manufactured without really flexible parts. In this way low-cost conference and meeting chairs may be manufactured.

Further features of the invention are listed in the claims 2-10.

10 Examples

The invention is further described with reference to the drawings, in which

Fig. 1 is a schematic plan view showing a chair seat suitable for a chair in accordance with the invention, while

Fig. 2A-C show in perspective three positions of use for the chair seat shown in Fig. 1.

15

Fig. 1 shows a chair seat 11 meant for a working chair or a meeting chair. The seat is divided into a rear part 12 extending across the width of the seat and covering 1/2-1/3 of the seat length, and a front part divided into three including a middle part 13 in the form of a saddle covering 1/4-1/3 of the width, and two symmetrically situated flaps or wings 14A-B
20 completing the rest of the width of the seat 11, the shape being that of a horse shoe.

The central saddle part 13 converges towards the front of the seat and is separated from the wings 14A-B by slits 15A-B, which form an opening between the wings and the saddle part 13.

The saddle part 13 is connected to the rear part of the seat 12 at a division line 16, shown
25 with dotted lines in the figure, while the two wings are connected with division lines 17A-B, running slightly backwards from the bottom of the slits 15A-B, and shown with a full line.

The remaining structure of the chair seat 11 and the function will be clarified by the description of Fig. 2A-C.

The chair seat 11 in Fig. 2 has a starting position or a neutral position as shown in Fig.
30 2A. In this position all the parts are located at the same level, later called the normal level, and with a slight slope forwards. This corresponds to a normal position of sitting for a chair being used in offices or in meeting rooms.

Fig. 2B shows a position of use where the wings 14A-B are bent making them slope downwards at an angle α with respect to the normal level. It is important to the function of the chair that this bending takes place with correct springing characteristics. The wings are to have a prestressing towards the normal level enabling the chair seat to provide even support to the body when the chair seat is in the normal position. To be able to have the right prestressing for heavy or light persons, it may be necessary in certain circumstances to create chairs adjusted for different categories of weight, or forming the elastic spring mechanisms so that they may be adjustable. This can be an adjustment made once for the single person or the persons being in the same weight group.

- 10 The position of use being illustrated in Fig. 2B is when the user wishes to stretch the body and increase the angle of the hips for a shorter or longer period of time.

Fig. 2C shows a third position of use of the chair seat shown in Fig. 2A where the back part of the seat 12 is pivoted upwards from the normal position, while the saddle part 13 is kept in its normal position. This pivoting is achieved by means of an articulation with the lower part or a bending zone in the inner supporting structure of the seat.

The chair seat as shown in Fig. 1 and 2A-B has an undercarriage being of known form and with a back rest. These parts can be based on known technology and will not be described any further.

- The saddle part 13 is formed with stuffing to an extent greater than for usual chair bolsters in the vertical direction. This makes the saddle part more easy to use and helps avoiding sharp edges both at the sides and in the front. The saddle part 13 may extend towards the front of the chair seat as shown in Fig. 1 or end further back as shown in Fig. 2.

- The seat in accordance with the invention can be built with a support plate made of stiff plastic material or metal. In the case where plastic material is used, this support plate may be formed with a bending zone of thinner material. The seat carrier can be made from a plastic material constructed to be bent in a certain angle, e.g. up to 15° , reverting to the starting position when the power causing the bending ceases.

- The choice of material and construction of the bending zone is critical because it is important to have correct force-bending characteristics and that this is consistent all through the life time of the chair. Tests have shown that the material KEVLAR (trademark) provides satisfying results with suitable design. An alternative form is a plate formed seat carrier divided by a hinge and being laminated with a layer of flexible material, such that after bending and removal of the bending force the seat returns to a neutral position. As an

alternative to a hinge, the plate parts may be connected by a bendable elastic material, or by a part of a material with low levels of elasticity.

Both examples show a seat part covered with soft-elastic stuffing, e.g. foamed plastic, and a cover made of textile.

- 5 It is possible to modify the seat in a way having only one stiff seat part, that can be flexed or pivoted, that is tilted with respect to the horizontal plane position and with respect to the surface of the saddle part centrally located. It is of vital importance in both cases that the part or parts being able to pivot and flex down about a crossing axis against an elastic counter force, in relation to the part being fixed, in order to enable the change of sitting
- 10 position by changing the angle of the hips of the user.

Patent claims:

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1. A chair seat (11), being divided in several parts (12,13,14A-B), being connected in a way enabling them to be bent at an angle with respect to each other around a connecting
5 line or zone, **characterized** in that it comprises a fixed part and a pivoting part, and the pivoting part can pivot down around a crossing axis from a starting position against an elastic counter force, making it possible to change the sitting position by changing the angle of the hips of the user.

2. A chair seat (11) in accordance with claim 1,
10 **characterized** in that the seat has a saddle shaped middle part centrally located and being fixed, and a plate shaped seat part surrounding the middle part in at least some part of the sides and backwards, and that the plate shaped seat part may pivot around a crossing axis against a counter force.

3. A chair seat in accordance with claim 1,
15 **characterized** in that the seat comprises a fixed rear part with generally horizontal or slightly upwards curved neutral position, and two sideparts or flaps, projecting forward from the back seat part with an internal distance, while these flaps are arranged to elastically bend down against a counter force when the user opens the angle of the hip when using the chair seat.

20 4. A chair seat in accordance with claim 3,
characterized in that
- the seat part (11) is divided into a rear, crossing part (12) and two wings (14A-B) extending generally symmetrically forwards from the rear part (12), and
- that the wings (14A-B) are elastically bendable connected to the rear crossing part (12),
25 enabling a bending down from a neutral position against a counter force.

5. A chair seat in accordance with claim 3,
characterized in that the seat part consists of a central, forward extending saddle shaped part (13) being located between the two wings (14A-B), which are extending forward from the rear part (12).

30 6. A chair seat in accordance with claim 5,
characterized in that the chair seat (11) is supported to be pivotable around a lateral axis to pivot the rear, crossing part (12) while the chair seat is prestressed towards the lower position with a spring organ.

7. A chair seat in accordance with claim 5,
characterized in that the saddle shaped part (13) is separated from the wings (14A-B) by two slits (15A-B) mutually converging in a forward direction.
8. A chair seat in accordance with one of the claims 5 or 7,
5 **characterized** in that the saddle part (13) has a cushion extending over the cushion of the wings (14A-B) in a vertical direction.
9. A chair seat in accordance with one of the claims 1-4,
characterized in that the wings (14A-B) are connected with the rear, crossing seat part (12) at lines of connection (17A-B) extending from the bottom of the slits (15A-B) separating the
10 wings from the saddle part.
10. A chair seat in accordance with one of the claims 1-7,
characterized in that it comprises a seat carrier (20) made of a plate material having at least one elastic bendable weakening zone, e.g. KEVLAR, (trademark) and/or that it comprises a seat carrier being laminated with an elastic bendable material reverting to its plane starting
15 position after stressing.
11. A chair seat in accordance with one of the claims 1-10,
characterized in that the seat carrier is articulated to a supporting base, being pivotable around an axis extending transversely in the rear part of the saddle shaped part, the pivot movement being prestressed towards a general horizontal position of the seat part.
- 20 12. A chair with a seat as described in one of the claims 1-11.

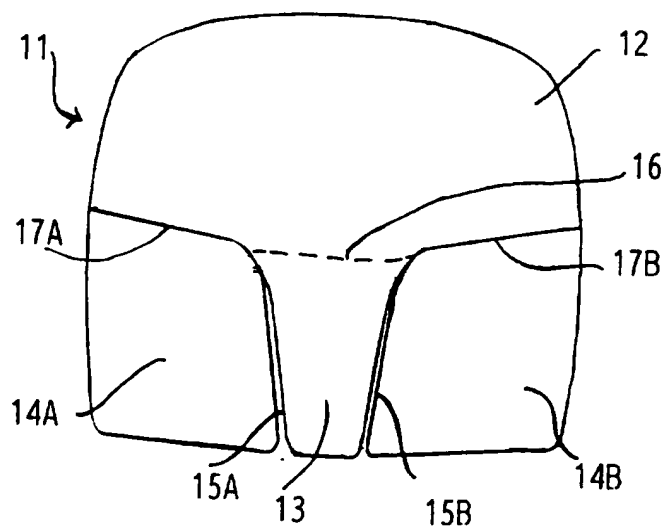
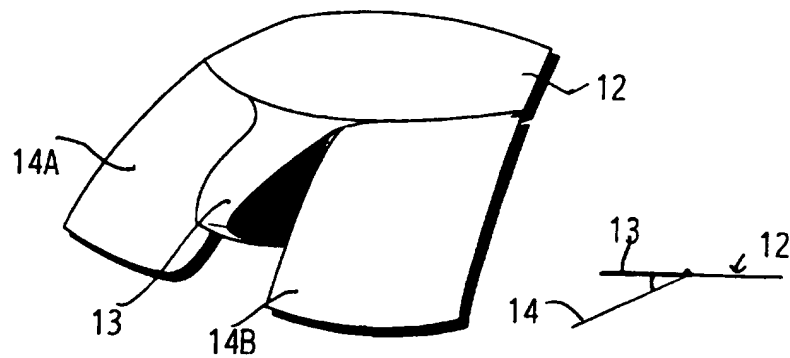
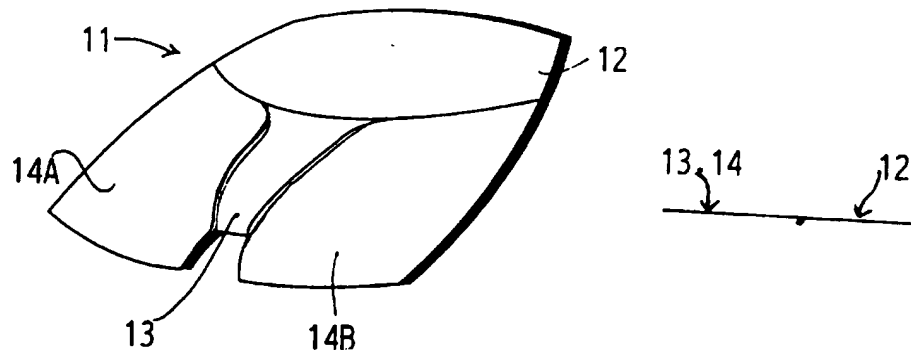
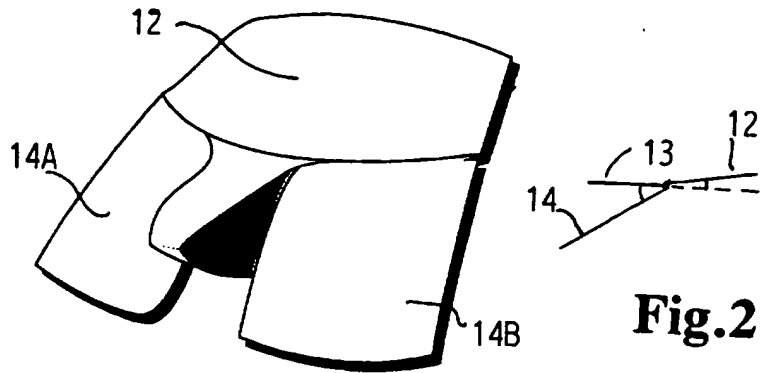


Fig.1

2/2



SUBSTITUTE SHEET

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 95/00182

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A47C 7/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 800488 C (F. DRABERT), 28 December 1950 (28.12.50) --	1-12
X	DE 2906602 A1 (ANDREASSON, S.A.G.), 23 August 1979 (23.08.79) --	1-12
X	WO 9317604 A1 (MERCADO MEDIC AB), 16 Sept 1993 (16.09.93) -----	1-12

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search

Date of mailing of the international search report

11 January 1996

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INTERNATIONAL SEARCH REPORT
Information on patent family members

11/12/95

International application No.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-C- 800488	28/12/50	NONE	
DE-A1- 2906602	23/08/79	FR-A- 2417975 GB-A, B- 2014844	21/09/79 05/09/79
WO-A1- 9317604	16/09/93	EP-A- 0610267 EP-A- 0631481 JP-T- 6506766 NO-A, D- 943224 SE-C, C- 500832 SE-A- 9200680	17/08/94 04/01/95 28/07/94 31/08/94 12/09/94 06/09/93